ZEYANG YAO

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EDUCATION

Ph.D. Candidate in Computer Science, **Old Dominion University** Jan 2022 - D.S.
Master in Cardiovascular Surgery, **South China University of Technology** Sep 2018 - Jan 2021
M.D. in Clinical Medicine , **Shantou University Medical College** Sep 2013 - Jun 2018

WORK AND RESEARCH EXPERIENCE

Research and Teaching Assistance in Old Dominion University Jan 2022 - Now

- Research topics focus on deep clustering and multi-modality data and multi-model confusion.
- Teaching undergraduate students in Introduction to machine learning and Algorithm and Data Structure in C++.

Laboratory of Artificial Intelligence for Cardiovascular Diseases Mar 2019 - Jan 2022

- Focus on Computed Tomography (CT) image of congenital heart disease (CHD) segmentation.
- Cardiovascular diseases risk prediction model establishing based on machine learning.

Guangdong Provincial People's Hospital: Cardiovascular Resident Doctor Sep 2018 - Feb 2019

- Honored to work and conduct research in one of the top 3 heart disease center of China.
- Participating in all aspects of taking care of congenital cardiac surgery patients.

The Nineth General Hospital of Shenzhen: Intern Doctor Jul 2017 - Jun 2018

- Training in general internal medicine, surgery and other areas of medicine.

PROFESSIONAL SKILLS

Development Languages: Python, R, Matlab, Java, Javascript, C++, Linux etc.
Image Processing Skills: Mimics, 3-matic Research, 3D Slicer
Other Skills: Photoshop, Adobe Illustrator, LaTeX, Microsoft Viso

PUBLICATION

Congenital Heart Disease: **Artificial Intelligence** Dec 2021 | **Published**

- Designed and developed a prediction model for pulmonary venous obstruction (PVO).
- Implemented prior medical knowledge based parameters selection and established prediction models.

Pyramid-Net for Retinal Vessel Image Feature Aggregation Dec 2021 | **Published**

- Proposed a Pyramid-Net can effectively improve the segmentation performance especially on thin vessels.
- Modality clinical data involved in prediction model establishment.

False Lumen Thrombus Segmentation Aug 2021 | **Published**

- Using a 3D U-net based framework to segment false lumen thrombus in type-B aortic dissection.
- Explore the possibility of artificially creating clinical endpoint events.

P/TAVC: Real-World Study of Follow-up Results Nov 2021 | **Published**

- Analysing the reliability of clinical conclusions from real-world source data .
- Discussed the clinically accepted methods of processing missing data and its credibility.

Permanent epicardial pacing in neonates and infants less than 1 year old Jan 2022 | **Published**

- Co-designing and conducting a 12-year retrospective study based on a single center data.

Surgical repair for simple tapvc in neonates Jun 2022 | **Published**

· Combining the medical and statistical perspectives of data analysis to conclude acceptable to clinicians.

3D heart modeling and AI, and new cardiac surgery in less-developed regions Dec 2022 | **Published**
· Independently responsible for data collection, coding and model establishment.

P/TAVC: A Retrospective Study Nov 2021 | **Published**
· A Retrospective study of P/TAVC patients who underwent correction and artificial valve ring implantation.
· Analyzing risk factors for specific patients, exploring feasible directions for the intervention of risk factors.
· Discussing the reliability of the conclusions of the small sample subgroup analysis in data analysis.

Automatic Segmentation of CHD CT Images Under review
· Combining graph matching and neural network to automatic segmente CHD.
· Introducing two cardiovasecular imaging specialists to evaluate our segmentation method.
· Introducing the Van Praggh classification system in the medical field to CHD segmentation.

CHD Automatic Diagnosis: A Pilot Study Under Review
· Automatic classification of CHD CT images based on previous segmentation algorithms.
· Combination of traditional feature engineering and neural network classification together.
· Discussed the feasibility and medical significance of the algorithms.

AI based Framework for Surgical Telementoring Under Review
· An Artificial Intelligence (AI) based CT processing framework for surgical telementoring of CHD.
· Responsible for the collection and processing of medical data.

P/TAVC: Risk Factor Analysis of Early Postoperative Complications Under Review
· Risk factors analysis of patients after partial and transitional atrioventricular canal defect (P/TAVC) repair.
· Using teh basic machine learning model to analyze the collected dataset.

PROJECTS

Deep Clustering methods of Single Cell Multiomics Data Spring 2022 - D.S.
· Focused on Chromium Single Cell Gene Expression, Chromium Single Cell Multiome ATAC + Gene Expressiondata analysis. Raw data (FASTO)cell ranger/ cell ranger-arc, following R/Python analysis, trajectories analysiscell-cell communication, RNA velocity. Demultiplex sequencing .BCL data(currently working on)I focus on single cell sequencing samples of mouse heart MI models, mouse adipose tissue, bovine muscle tissueand adipose tissue. A High-Performance Computing (HPC) based analysis process has been built

Breast Cancer Image Segmentation and predication Spring 2022 - D.S.
· Segmentation for breast cancer data and establish multi-modality predication model.

CHD Automatic Segmentation and Diagnosis Sept 2019 - Nov 2021
· Classification of CHD CT images based on previous segmentation algorithms.
· Feature extraction for different types of congenital heart disease.

Quality Evaluation of CAVC Surgery Master Thesis
· Endpoint events prediction after complete atrioventricular canal defect (CAVC) repair.
· Performed data collection, preprocessing, transformation and handled missing data values on a CAVC dataset.
· Develop a prospective research plan to external validate the disease prediction model.

ADDITIONAL INFORMATION

· Friendly, Outgoing, Dedicated in Computer-Medicine intersection area.
· Google Scholar Page: `https://scholar.google.com/citations?user=QpbEX6UAAAAJ&hl=en&oi=ao`
· Interested in talk show, other topics of interest are football, running, swimming, and painting.
· Taken several courses on MOOC and other online platforms, including Machine Learning, Operation System etc.
· Obtained the Qualification Certificate of Practicing Physician of the Republic of China.